

REMARKS

By this amendment, claims 1-3 and 10-12 have been amended. New claims 18-26 have been added. Claims 1-3, 10-12 and 18-26 remain in the application. This application has been carefully considered in connection with the Examiner's Action. Reconsideration, and allowance of the application, as amended, is respectfully requested.

Rejection under 35 U.S.C. § 103

Claim 1

Claim 1 recites an ultrasonic transducer, comprising: a plurality of micro-machined ultrasonic transducer (MUT) elements formed on a substrate, the substrate including a first surface and a second surface; and a plurality of vias associated with each MUT element and extending entirely through the substrate between the first surface and the second surface, wherein each MUT element comprises a plurality of MUT cells and wherein the plurality of vias include vias proximate to and surrounding each MUT cell, the plurality of vias further having a diameter towards the first surface that is different than a diameter of the respective vias towards the second surface, where the vias reduce the propagation of acoustic energy traveling laterally in the substrate.

Claims 1, 2, 10 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over **Khuri-Yakub et al. (US 6,262,946 B1)**.

Applicant traverses this rejection on the grounds that this reference is defective in establishing a prima facie case of obviousness with respect to claim 1.

As the PTO recognizes in MPEP § 2142:

... The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of

nonobviousness...

It is submitted that, in the present case, the examiner has not factually supported a prima facie case of obviousness for at least the following, mutually exclusive, reasons.

1. The Reference Does Not Teach the Claimed Subject Matter

The **Khuri-Yakub et al.** reference cannot be applied to reject claim 1 under 35 U.S.C. § 103 which provides that:

A patent may not be obtained ... if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains ...
(Emphasis added)

Thus, when evaluating a claim for determining obviousness, all limitations of the claim must be evaluated. However, since **Khuri-Yakub et al.** does not teach a plurality of vias associated with each MUT element and extending entirely through the substrate between the first surface and the second surface, wherein each MUT element comprises a plurality of *MUT cells* and wherein the plurality of vias include vias proximate to and surrounding each *MUT cell*, the plurality of vias further having a diameter towards the first surface that is different than a diameter of the respective vias towards the second surface, as is claimed in claim 1, it is impossible to render the subject matter of claim 1 as a whole obvious, and the explicit terms of the statute cannot be met.

In contrast, **Khuri-Yakub et al.** teaches interrupting the cross-coupling by providing a slot in the substrate (Fig. 10; Column 2, lines 36-37), which is also referred to as a "channel" (Column 4, line 19). Accordingly, **Khuri-Yakub et al.** requires a slot surrounding the transducer elements as opposed to a "plurality of vias" having a diameter towards the first surface that is different than a diameter of the respective vias

towards the second surface as required in claim 1 of the present application.

Thus, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103 should be withdrawn.

2. The Reference is Improper

Assuming, arguendo, that the above argument for non-obviousness does not apply (which is clearly not the case based on the above), there is still another, mutually exclusive, and compelling reason why the **Khuri-Yakub et al.** reference cannot be applied to reject claim 1 under 35 U.S.C. § 103.

§ 2142 of the MPEP also provides:

...the examiner must step backward in time and into the shoes worn by the hypothetical 'person of ordinary skill in the art' when the invention was unknown and just before it was made..... The examiner must put aside knowledge of the applicant's disclosure, refrain from using hindsight, and consider the subject matter claimed 'as a whole'.

Here, **Khuri-Yakub et al.** neither teaches, or even suggests, the desirability of the combination since **Khuri-Yakub et al.** does not teach the particular combination of a "plurality of vias" having a diameter towards the first surface that is different than a diameter of the respective vias towards the second surface, as specified above and as claimed in claim 1.

Thus, it is clear that the patent does not provide any incentive or motivation supporting the desirability of the combination. Therefore, there is simply no basis in the art for combining the references to support a 35 U.S.C. § 103 rejection.

In this context, the MPEP further provides at § 2143.01:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.

In the above context, the courts have repeatedly held that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination.

In the present case it is clear that the examiner's combination arises solely from hindsight based on the invention without any showing, suggestion, incentive or motivation in the reference for the combination as applied to claim 1. Therefore, for this mutually exclusive reason, the examiner's burden of factually supporting a *prima facie* case of obviousness has clearly not been met, and the rejection under 35 U.S.C. §103 should be withdrawn.

Accordingly, claim 1 is allowable and an early formal notice thereof is requested.

With respect to claim 2, the claim depends from and adds further limitation, in a patentable sense, to allowable claim 1. Accordingly, claim 2 is believed allowable. Claim 10 contains limitations similar to those of claim 1 and is believed allowable for at least the same reasons for allowability of claim 1. With respect to claim 11, the claim depends from and adds further limitation, in a patentable sense, to allowable claim 10. Accordingly, claim 11 is believed allowable.

Claims 3 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over **Khuri-Yakub et al.** as applied to claims 1 and 10 above, and further in view of "**AN EFFICIENT ELECTRICAL ADDRESSING METHOD USING THROUGH-WAFER VIAS FOR TWO-DIMENSIONAL ULTRASONIC ARRAYS**" by **Ching H. Cheng et al.**. Applicant respectfully traverses this rejection for at least the following reasons. Claims 3 and 12 depend from and further limit, in a patentable sense, allowable independent claims 1 and 10, respectively, and therefore are allowable as well.

Double Patenting Rejection

Claim 1 was rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,669,644 B2. This rejection is respectfully traversed for the following reason. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) has been submitted concurrently herewith. Accordingly, claim 1 is now believed allowable.

Claim 2 was rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,669,644 B2 in view of **Cheng et al.** This rejection is respectfully traversed for the following reason. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) has been submitted concurrently herewith. In addition, claim 2 depends from and further limits, in a patentable sense, allowable independent claim 1, and therefore is allowable as well.

Claim 3 was rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 1 of U.S. Patent No. 6,669,644 B2. This rejection is respectfully traversed for the following reason. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) has been submitted concurrently herewith. Accordingly, claim 3 is now believed allowable.

Claim 10 was rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 7 of U.S. Patent No. 6,669,644 B2. This rejection is respectfully traversed for the following reason. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) has been submitted concurrently herewith. Accordingly, claim 10 is now believed allowable.

Claim 11 was rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 7 of U.S. Patent No. 6,669,644 B2 in

view of **Cheng et al.** This rejection is respectfully traversed for the following reason. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) has been submitted concurrently herewith. In addition, claim 11 depends from and further limits, in a patentable sense, allowable independent claim 10, and therefore is allowable as well.

Claim 12 was rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 7 of U.S. Patent No. 6,669,644 B2. This rejection is respectfully traversed for the following reason. A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) has been submitted concurrently herewith. Accordingly, claim 12 is now believed allowable.

New claims 18-26 have been added to provide more complete claim coverage. In particular, claims 18-21 depend from and further limit, in a patentable sense, allowable independent claim 1, and therefore are allowable as well. New claim 22 contains limitations similar to those of claim 1 and is believed allowable. In addition, claims 23-26 depend from and further limit, in a patentable sense, allowable independent claim 10, and therefore are allowable as well.

Conclusion

It is clear from all of the foregoing that independent claims 1, 10 and 22 are in condition for allowance. Dependent claims (2-3, 18-21) and (11-12, 23-26) depend from and further limit independent claims 1 and 10, respectively, therefore are allowable as well.

The amendments herein are fully supported by the original specification and drawing, therefore, no new matter is introduced.

An early formal notice of allowance of claims 1-3, 10-12 and 18-26 is requested.

Respectfully submitted,

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